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**TOWARDS AN INTEGRATED THEORY
OF VALUE, CAPITAL AND MONEY**

1. The current state of the theory.

The theory of value and capital is a complex and intellectually compelling subject, dealing with the theoretical foundations of political economy and characterized by a high level of abstraction. Value and capital shape every aspect of human activity. They must be combined to produce an output. Nothing can be produced with unassisted labour or capital.

Value is the basic concept. It may be conceived either as a common substance of commodities, an intrinsic and general property of them, or as a subjective form of appearance. The theory of value should explain what determines the value of commodities. In economics, it encompasses a wide range of approaches.

Capital is a form of value and a store of value: produced and productive wealth, value in progress. It takes different forms and has a plurality of logical dimensions (physical, financial and temporal). One can conceive it as a revolving fund of uncommitted purchasing power, suitable to be expressed in homogeneous units of value and to generate an income in form of interest. Or, alternatively, as a tangible stock of heterogeneous capital goods, which generate an income in

form of profit. Or as a flow of capital services (the flow conception of capital).

The theory of capital is thus part of the wider theory of value, the part of it which deals with the inter-temporal aspects of resource allocation and is connected with the theory of income distribution. In the theory of capital time and money are strictly intertwined. Both of them play an important role. Time is money and money provides a formal mediation between values and prices.

Up to now, the study of the links between the theory of value and the theory of capital has been carried out at two distinct levels of determination: the value-theoretic qualitative analysis of the inner logic of the economic process, undertaken by theoretical economists, and the empirical valuation of assets made by bookkeepers and chartered accountants in their balance sheets, where assets, liabilities and their difference (net worth) are recorded at a given point in time, following institutional rules and local habits.

Money too is a value-form, the most general one – the ‘general equivalent’ which allows to appraise values and to convert labour values into money prices. If it is destined to productive purposes, in an analytical framework subject to a cash-in-advance constraint, money provides a liquid form of capital. The relation between value and money is a basic problem in the theory of value.

The present state of the theory of value, capital and money is rather disappointing. This is in part due to the analytical difficulties of the subject and to its high level of abstraction, and in part to the influence exerted by pre-analytic visions of the relations between quantities, prices and the distribution of income.

An ideological presupposition is present in the surplus approach, that of the alleged separability of classical analysis into distinct sequential logical stages in which the level and composition of the social product, the real wage and the technical conditions of production would be determined in an analytical *core*, prior to the relative prices of commodities and to the social distribution of income.¹

On the other hand, we are referring to the neoclassical belief in a mutual and simultaneous determination of all these variables, as a result of the interaction of the market forces of demand and supply, in a general equilibrium framework in which no causal relation could be evidenced, as anything depended on anything else (or nearly so, because luxury goods are not ‘basic’ commodities).

¹ The ‘classical separability’ is a tale devoid of historical legitimacy, supported by Garegnani to highlight the connections of Sraffa’s theoretical system with those of Ricardo and Marx. The idea of a separate determination of prices and distribution was advanced by Ricardo, in his early *Essay on Profits* (1815), where a simple corn model was considered; but was later abandoned in the third edition of his *Principles* (1821), as a result of some objections moved by Malthus. On this point, see Cavalieri (2009). Smith and Marx did not mentioned the separation.

The purpose of this paper is to contribute in a non-dogmatic critical Marxian perspective to establish the basic guidelines of an integrated approach to the theories of value, capital and money. The essay is divided in two parts. In the first one, some fundamental unsettled theoretical issues concerning the nature, the source and the measurement of value and capital are recalled and analyzed. There is also a critical examination of some recent lines of search in this field. In the second part, the first draft of an integrated theory of value, capital and money is outlined, in a 'late-Marxian' up-to-dated perspective. Its basis is a full-cost-of-production theory of price, augmented by a normal profit margin.

PART ONE - SOME UNSETTLED PROBLEMS IN CAPITAL THEORY

1.1 Three basic questions.

A theory of value should answer three fundamental questions: the ontological search for the source or qualitative substance of value, the search for a quantitative measure of value and that of the relation between value and money. These questions are strictly connected.

This point was clear to Adam Smith, who identified both the source and the measure of value in labour: the former in its productive power, the second in the sacrifice labour implies (its

‘toil and trouble’). Smith held two labour theories of value: a ‘labour-embodied’ theory that concerned the “early and rude state of society which preceded the accumulation of capital and the appropriation of land”, when commodities were valued at their real cost, measured by the amount of labour-time implied by their production or acquisition, and a ‘labour-commanded’ theory that applied to a capitalist society where production was undertaken for profit and addressed to the market. The external measure of value was money; the internal measure was the amount of labour-time for which a commodity exchanged in the market. It was not clear which theory of value Smith ultimately held: a theory based on the real cost of production of commodities, or a different theory based on their money cost.

A further element of confusion was due to the fact that Smith held also a cost-of-production theory of long-run natural or normal prices, towards which current market prices were assumed to gravitate, under changing supply and demand conditions. Wages, profits and rents entered in this ‘adding-up’ theory of prices as independent money cost components, determined by supply and demand conditions. Therefore prices could deviate from values, contrary to what was implied by the labour theory, in which labour was the only source of value.

The point did not pass unnoticed to Ricardo, who criticized Smith’s adding-up theory of price and his labour-commanded theory of value. Ricardo was in search of an

invariable measure of value – an absolute standard which would always require the same quantity of labour to be produced, independently of the social distribution of income – suited to derive the basic inverse relationship between wages and profits.²

Scarcely concerned with the analysis of value forms, but conscious of the time structure of production,³ Ricardo focused on the labour-embodied theory of value, which he extended to cover any production of commodities. The result was a ‘cost-plus’ pricing theory, where commodities were priced in the long-run at their labour cost plus a ‘normal’ profit margin (rent was not treated as a cost component, but as a surplus, like extra profit). This wages-and-profit theory of value, focusing on the supply-side of the market, implied strict proportionality between labour values and prices at the aggregate level, but allowed for sector deviations from this norm.

² For this reason, Ricardo was criticized by Marx. “Ricardo often gives the impression, and sometimes indeed writes, as if the quantity of labour is the solution to the false or falsely conceived problem of an ‘invariable measure of value’” (Marx, *Theories of Surplus Value*, chapter X).

³ “I sometimes think that if I were to write the chapter on value again which is in my book, I should acknowledge that the relative value of commodities was regulated by two causes instead of by one, namely, by the relative quantity of labour necessary to produce the commodities in question, and by the rate of profit for the time that capital remained dormant, and until the commodities were brought to market” (Ricardo, W.C., vol. VIII, p. 193).

This theory was, for Ricardo, only a first approximation to reality. Clearly, it did not represent a ‘detour’ from the Smithian tradition, centred on the cost side.⁴

1.2 Marx: the young and the elder.

Then came Marx. His initial approach had some evident Ricardian roots. As a value-theorist, however, Marx was not a Ricardian. He reasoned at a higher level of abstraction, took abstract labour as the source of value and was critical of Ricardo’s failure to distinguish between labour and labour-power and between the stock and flow components of capital. Compared to Ricardo, Marx was endowed with greater historical consciousness. He did not conceive capitalism as a natural and eternal economic system, but as a specific historical mode of production. He had a realistic vision of the links of the theory of value with the theory of money.

Marx’s theory of value evolved over time.⁵ He initially held the labour-embodied theory of value, which he conceived in a dogmatic way. He assumed but did not prove its validity.

Later on, Marx gradually realized that in capitalist systems commodities did not exchange at their values, as in

⁴ This was questionably argued by Schumpeter, Knight and others.

⁵ The debate on the evolution of Marx’s theory of value is scarcely known, but we are not going to recall it here. A small number of Marxist and non-Marxist scholars took part in it, either to support the idea that in his mature years Marx held a cost-of-production monetary theory of value, or to deny it and to reaffirm his lifetime loyalty to the labour theory of value.

pre-capitalist economies, but at their market prices, mediated by money. This led him to make some openings towards a different theory of value, in which both living and dead labour stored-up in capital goods were regarded as direct sources of new value.

However, he did not formulate a full-fledged labour-and-capital theory of value. Why? Probably because he knew that by recognizing that capital plays a fundamental role in the production of social surplus, and that its use involves a cost, for postponement of consumption, or for a rental payment, an entitlement of the owners of capital to get a share of social output could not be denied.

Significant changes in Marx's theoretical conception occurred in the middle 1840s. They signed his passage from a positive humanist anthropological vision to a historical materialist one and from a labour theory of value to a cost-of-production theory.

In *Grundrisse* (1857-58) Marx made clear that labour and capital had both an active role in capitalist production.⁶ Moreover, an unpublished 1864 draft of chapter 6 of *Capital*,

⁶ “... once adopted into the production process of capital, the means of labour passes through different metamorphoses, whose culmination is the machine, or rather, an automatic system of machinery... The worker's activity, reduced to a mere abstraction of activity, is determined and regulated on all sides by the movement of the machinery, and not the opposite” (Marx, *Grundrisse*, 1857-58, chapter on capital, ‘Fragment on machines’, notebook VI, par. 585-86).

vol. I, opened with a paragraph entitled *Commodities as the product of capital*, in which Marx noticed that a significant transformation of the labour process had occurred in advanced capitalist systems. It was capital that employed the worker, not the worker capital.⁷

Three years later, in the first volume of *Capital*, Marx wrote that in modern industry “*the labourer becomes a mere appendage to an already existing material condition of production*” and that there had been a ‘complete inversion’ of the relation between living and dead labour, which had signed the passage from a formal to a real subsumption of labour to capital.⁸

There is therefore textual evidence to corroborate the idea that in his mature age Marx recognized that in capitalist systems capital goods are directly productive of new value. Machines were regarded by Marx as the objectified power of abstract social knowledge: the product of ‘General Intellect,’ an entangled mix of collective intelligence, creativity and

⁷ “*It is not the worker who buys the means of production and subsistence, but the means of subsistence that buy the worker to incorporate him into the means of production*” (Marx, *Results*, 1864, p. 1004).

⁸ In *Capital*, vol. II, Marx dealt with the circulation of commodities over time and between the various sectors of the economy, and with their expression in terms of money. In vol. III, following Ricardo, he mentioned the possibility of deviations from the law of value due to the heterogeneity of capital goods and explained the working of the market competitive mechanism by which profits are allocated between sectors at a uniform rate, through the competition of capitals.

knowledge. This was a premise for the construction of a different theory of value, one based on the money cost-of-production, augmented by a normal profit margin.

1.3 From the labour theory to the law of value.

The young Marx's pure labour theory of value was clearly contradicted by the tendency of competition to establish a uniform rate of profit on capital goods of different organic composition. Its abandonment signed Marx's passing to a more general conception, that of a 'law of value', which would regulate the determination of commodities relative prices according to their unit costs of production.⁹

The law was conceived by Marx as the fundamental principle regulating the production of commodities, the determination of their relative prices and the distribution of labour between different industries. The law was supposed to hold at a macroeconomic level, for 'capital in general', and to allow for possible 'mutually compensating' exceptions (a disturbing feature) at the microeconomic level, for single commodities.

Two important implications of the abandonment of the pure labour theory of value in favour of a cost-of-production

⁹ The law of value was known by classical economists. Ricardo mentioned it as the principle by which the value of any commodity depends on the relative quantity of labour which is required for its production, and not on the magnitude of the compensation paid for that labour.

monetary theory should be noticed. One of them concerns the analytical treatment of wages and non-wage incomes, whose aggregation should take place correctly. The social surplus cannot be conceived as the heterogeneous sum of net profits (profits net of depreciation) and gross wages (wages inclusive of workers subsistence goods). This is the conventional way social surplus is measured in national accounts, where profits are underrated and wages are overvalued. As a result, the social distribution of income is artificially altered and Marx's reasons for social conflict are obscured.

A second implication of our approach to the value problem concerns the treatment of normal profit, the minimum level of profit required to keep productive factors in their current use in the medium and long-run. Normal profit is a cost. It is an implicit cost which becomes relevant when an explicit cost in the form of interest is not paid by a firm to an outside lender.

Normal profit does not reward only the capital services used in production, but also the entrepreneur's time, ability and energy. This circumstance has important theoretical and practical implications, because the profit margin, on whose basis dividends are paid and taxes are computed, is reduced. The owners of capital are paid a normal profit as a

compensation for their renounce to invest their money in more valuable alternative projects.¹⁰

Economic profit is the difference between total revenue and total costs (both explicit and implicit costs). Accounting profit is revenue less explicit costs. It thus include normal profit, which is not included in economic profit. In a business there may be an accounting profit and no economic profit.

Hereafter, we shall focus on economic profit and disregard accounting profit. We shall add normal profit to the explicit costs of production and subtract their sum from total revenue.

1.4 Further theoretical developments.

In the second half of the 19th century the attention paid by the economists to the theory of value turned from the supply to the demand side of the market.¹¹ That is from cost to utility and scarcity.¹²

¹⁰ The implicit rental cost of invested capital is the value ascribed to the best alternative project foregone. Normal profit should be distinguished from 'pure' or 'extra' profit, the surplus-value originated by labour exploitation, market power and windfall gains, appropriated by the owners of capital, which must be considered ethically illegitimate, when it is not justified by an abnormal risk taking .

¹¹ J.B. Clark, who conceived capital as a permanent moving fund of uncommitted purchasing power, had become the highest authority on capital theory. Alfred Marshall had tried to reconcile the supply and demand sides of the theory of value and to close the gap between the economist and the businessman conceptions of capital, without much success. In his theory optimizing behaviour of economic subjects and factor substitution in

In the early 1930s, during a controversy which opposed Hayek to Keynes and his 'Cambridge Circus', new capital theoretic issues were raised: whether investment was inversely related to the rate of interest, or directly related to final demand; whether the market mechanism had in itself sufficient stabilizing capacity in depression times; and what was the relative influence exerted by monetary and real factors on the capital structure.¹³

The debate on the theory of capital was reoriented towards neo-Walrasian models. In England Robertson and Hicks worked independently of each other in such direction. Keynes was not interested in the theory of capital. He pursued the construction of a general theory of asset holding, focused on the expected returns of new investments and on liquidity preference. He wished to make it consistent with his theory of

production, at the margin, were assumed. Money was neutral and no role was played by financial variables.

¹² An alternative theoretical approach had been proposed by Walras, in the framework of a general equilibrium model based on simultaneous equations, in which the prices of capital goods were determined by capitalizing the net incomes of their services. The traditional direction of imputation of value had been further questioned by Menger, the founder of the Austrian capital school, and by his pupils. They paid attention to the time structure of capital and Böhm-Bawerk tried to express it by a single number, the controversial 'average period of production'. Wicksell pointed out the analytical consequences (later named 'Wicksell effects') of the impossibility of measuring heterogeneous capital goods in homogeneous technical units.

¹³ Hayek was an advocate of the free market; Keynes was the promoter of an active counter-cyclical policy. Clearly, they could not agree.

income and employment, based on the principle of effective demand.

In the early 1950s a member of the Cambridge Keynesian group, Joan Robinson, attacked the aggregate production function used to describe the maximum level of output that could be obtained by a technically efficient use of given inputs in a single capital good neoclassical world, where the ‘quantity of capital’ was measured in homogeneous terms, independently of the social distribution of income. She posed the right questions – what was the meaning of the quantity of capital, in what units was capital measured and what determined the rate of profit – but did not succeed to stop the widespread use of neoclassical ‘parables’ employing this unsatisfactory analytical device.

The ‘Cambridge debate’ on the theory of capital was resumed a few years later, after the appearance of Sraffa’s book on production of commodities by means of commodities. In that phase of the debate two conceptions of value confronted each other: the ‘neo-Ricardian’ one, held by the Anglo-Italian school, and the neoclassical macroeconomic theory, that treated capital as a single homogeneous factor.¹⁴

¹⁴ In both sides internal distinctions were relevant. The ‘Sraffians’ held a commodity theory of value, the neo-Marxists a monetary labour theory. In the neo-classical side, a neo-Walrasian minority denied the need of capital aggregation.

The technical details of the controversy are widely known. The ‘neo-Ricardians’ were able to show that a fall in the interest (profit) rate is not necessarily associated with an increase in the capital intensity of production and that there is no monotonic inverse relation between the amount of capital per man and the reward for capital.¹⁵

The ‘Cambridge debate’ then closed, with scanty results. A lot had been deconstructed and little reconstructed.¹⁶ Basic questions in the theory of value and capital remained unanswered.

1.5 Contrasting views.

We shall now consider the positions held by three groups of ‘heterodox’ economists – the Sraffians, the post-Keynesians (PKs) and the Marxists – all of whom reject the neoclassical marginal productivity theory.

The Sraffians pursue a return to the standpoint of classical political economists. They refuse the labour theory of value, consider labour values redundant in price analysis and

¹⁵ Joan Robinson did not take part to this second phase of the debate. She did not share Sraffa’s emphasis on long-period positions (“a metaphysical concept”) and regarded his approach as too narrow in scope: half a general equilibrium system, centered on the supply side of the economy, that ignored the role of money, uncertainty and expectations.

¹⁶ Aggregate production functions continued to be used and paradoxical capital behaviours, as ‘reswitching of techniques’ and ‘capital value reversing’, continued to be considered empirical anomalies scarcely significant.

explain commodities relative prices in physical terms. Confined in the paradigm of a long-run stationary equilibrium, they treat the quantities of commodities as given physical data and relegate the social distribution of income out of the economic discourse.

Differently from them, the PKs focus on the short-period – on the principle of effective demand, on mark-up pricing and on the role of money and liquidity preference – and regard the interest rate as a monetary phenomenon.

Neo-Marxists and post-Marxists recognize labour as the origin of human wealth and living labour as the only direct source of new value. Some of them, the most critical, propose to substitute the old-fashioned Hegelo-Marxist paradigm of alienation and contradiction with non-dogmatic conceptions of value. For this purpose, they look in a variety of directions: from Western critical Marxism to post-structuralist and analytical Marxism.

In the last decades new attempts have been made by neo-Marxists to ‘re-read’ Marx’s theoretical system as a monetary theory of value and capital. They had two main sources. One was German, that of two left-wing radical groups, *Krisis* and *Neue Marx Lektüre*, which favoured the abolition of the value concept and a rejection of the idea of class struggle as driving motor of social history to money rejected and of the notion of dead labour. The other source was that of Foley’s and

Duménil's 'New Interpretation' (NI) of Marx's theoretical system, where money provided a formal mediation between labour values and production prices, living labour was identified as the only source of surplus-value, as in the 'simple commodity' production system considered by Marx in the initial chapters of *Capital*, the value of living labour was the money wage, a non-allocated amount of purchasing power, and the endowment of variable capital was given in money terms.¹⁷

In NI there is no duality between values and prices. The system is a single one. Everything is reckoned in terms of money and attention is focused on net output, instead than on gross output. Commodities values are interpreted as employment contents. The monetary productivity of labour is used as *numéraire*. The value of variable capital is the money value of labour-power, expressed by the share of wages in national income, and there is no need to transform values into prices. The labour theory of value is retained as explanation of the origin of value, though not of the relative prices of commodities. Wages are valued at the production prices of the wage goods bought by workers and the values of commodities are interpreted as shares of employment per unit of output, that is as 'normalized' production prices. This allows to pass from

¹⁷ A paradoxical result then emerged, as workers doing the same job, side by side, for an equal time, and getting the same money wage, would be illogically considered subject to different rates of exploitation, if they used their money wage to purchase different bundles of wage goods.

an accounting system in terms of non-observable labour values, subject to change when the social distribution of income changes, to one in employment terms, directly observable and unaffected by changes in the distribution of income. Marx's theoretical system would thus be valid even if prices would diverge from values.¹⁸

Two variants of NI were also proposed. One of them is the *Simultaneous Single System Interpretation* (SSSI), or *Equilibrium Marxism*. It was suggested by Sraffian scholars. Wealth was identified with use-values, instead than with exchange-values. Values and prices represented different levels of analysis of a single theoretical system. All capital, both variable and constant, was measured in money terms and regarded as initially given. Input and output prices were simultaneously determined in long period equilibrium. Therefore they could not be different, contrary to what happened in Bortkiewicz's famous *Dual System Interpretation*, where values were expressed in labour-time and prices in money terms.

The other variant of NI is the *Temporal Single System Interpretation* (TSSI), or *Marxian Disequilibrium Approach*,

¹⁸ If from the net product of national accounting, which does not include the amortization quotas of fixed capitals, one subtracts the necessary consumption of wage labourers, total profit will equal total surplus value, as argued by Marx.

advanced by fundamentalist neo-Marxists, where all variables are expressed in money terms and in temporal sequence. Prices can change during the production process. In each period the prices of inputs and outputs are not simultaneously determined. Therefore they can be different and the claims of internal inconsistencies that had been moved to Marx's theory of value could be rejected.¹⁹

TSSI has been criticized for its dubious hermeneutical correctness and for its arbitrary assumption of an equivalence of new value and living labour. Moreover, it does not ensure in the long-run a uniform rate of profit in the various sectors of the economy. This interpretation, however, deserves attention, because it reintroduces in the pricing problem the time element, which had been set aside after the decline of the theory of capital of the Austrian school. By so doing, it allows to account properly for technical progress.

A further post-Keynesian approach to economic policy is provided by the so-called Modern Monetary Theory (MMT), a 'neo-chartalist' approach whose proposers affirm that money is valuable because the government obliges people to pay taxes in the money it issues. Attention is focused on the role of fiat money, an unconvertible legal tender issued by a sovereign country. MMTers claim to have rediscovered the true nature of money and to be able to explain how money really works in a

¹⁹ See Kliman (2007) and Freeman and Kliman (2008).

modern economy. They consider deficit spending by the government as an entirely independent flow variable, unconditioned by the availability of financial means and by size of the national debt (a stock variable).

This is a naïve and counter-intuitive way of reasoning, a ‘chartalist’ conception of money, formulated in German by Knapp at the end of 19th century, endorsed by Keynes and ‘rediscovered’ nearly sixty years later by Wray, Mosler and other American heterodox economists. Their idea that a sovereign government can run budget deficits of unlimited amount in its money, without risking to become insolvent is a dangerous illusion. The economy would not be conditioned by the inflation-unemployment long-run trade-off of the Phillips curve type. The sovereign government could assign top priority to full employment. It could start job guarantee programs and behave as an employer of last resort. Budget equilibrium should no longer be a constraint. It would be the expression of a simple accounting identity.²⁰

This simplistic way of reasoning is subject to a destructive objection. While it is true that pure financial limits to government deficit spending do not exist, and should not be

²⁰ The government of a sovereign country, unlike individual households, is not revenue-constrained. It does not need to tax or sell bonds before it can spend to buy goods and services from the private sector of the economy, or to make transfer payments. By its deficit spending it creates an equal amount of private financial assets. The aggregate sum of financial assets and liabilities must necessarily be zero.

legally imposed, it is as much clear that there are real capacity constraints to a systematic expansion of deficit spending and that deficit spending does not provide a ‘free lunch’ solution, because an interest has to be paid for the debt service. The economy is both debt-led and debt-burdened.²¹ A budget deficit can stimulate a country’s economy in recession times. But as the economy recovers and the system approaches its full capacity, the deficit spending should stop and taxation should be increased to avoid incurring into a serious inflationary pressure.²²

1.6 Measuring the money value of real capital.

We come now to the second and third basic problems in the theory of capital: measuring the

$$K_t = I_t + (1 - \delta) K_{t-1}$$

value of a stock of heterogeneous capital goods which have multi-specific possible uses and ascertaining the nature of the relation between value and money (I_t is investment and δ depreciation).

The value of real capital K_t is the money value of capital goods divided by the real wage. This value can be measured in

²¹ A ‘no-Ponzi game’ intertemporal financial stability condition has to be satisfied in the long-run: the rate of growth of gross domestic product should not equalize or exceed on the average the real interest rate. The budget debt, however, can be financially sustainable and socially unsustainable.

²² MMT has been criticized as a rehash of old concepts rearranged in a mess, without the support of a formal analysis. See Palley, 2013.

various ways: (i) at its present replacement cost, a ‘snapshot’ valuation method that focuses on the current market supply price of capital and disregards its time structure;²³ (ii) at its updated historical cost, obtained by capitalizing the cost of past investments, reckoned in terms of labour time or of wage units, at a compound interest rate, and by subtracting depreciation and retirements; this gives the ‘book value’ of a capital stock, a ‘backward-looking’ value, that may be difficult to establish; (iii) in a ‘forward-looking’ perspective, for the expected capacity of real capital to produce a discounted flow of capital services which will presumably ensure a net income in the future (a neoclassical method); (iv) by estimating capital goods in terms of the length of their production process, by the average ‘waiting’ time which elapses between inputs and output (the Austrian method suggested by Böhm-Bawerk).

These four methods have been extensively analyzed in the literature. We shall not dwell upon them further on. We shall instead use a method of different, statistical nature, present in the literature. It implies the construction of an index-number of asset-prices, a line integral in continuous time of a vector field. This metric will provide a deflator of the money

²³ *Market Value* is nominal value (the sum of invested funds, plus subsequent advances and accrued interest, less repayments) augmented by accumulated revaluations. It is different from *Face Value*, which is nominal value less accrued interest.

value of real capital and should be used to convert labour values into money prices.

The money value of real capital will be calculated by making use of two specific money metrics, suited to convert labour values into money prices, and vice versa. A normal profit margin will be added to productive outlays, to account for the implicit rental cost of financial capital.

PART TWO – TOWARDS AN INTEGRATED STOCK-AND-FLOW MODEL

2.1 Modelling capital assets in money terms.

Differing from Marx, who used to distinguish capital into a constant and a variable component, both measured in labour values, and then to convert them in money terms, we shall measure capital directly in money terms, to avoid the unnecessary ‘transformation’ of values into prices.

We shall disaggregate capital into five components: 1) *fixed capital*, K_d , the stock of real and durable manufactured assets (physical capital), such as plant, machinery and other tangible sources of capital services, used as means of production and available for repeated uses; 2) *circulating capital* of material or technical nature, K_c (a flow of raw materials, auxiliary materials, energy and intermediate goods in process); 3) *financial capital*, K_f , a moving fund, reported in

the financial account, which has different sources (debt liabilities, equity costs, grants) and can be used to buy physical assets and to hire input services;²⁴ 4) *cultural capital*, K_i , a central concept in the theory of social reproduction where culture is identified as an intellectual asset, but a controversial concept in the theory of capital; 5) and *other intangible capital assets*, K_n , such as software, goodwill, reputation, exploration rights and people's ability to work together.

On the basis of this proposed taxonomy, the money value of capital will be measured by

$$K = K_d + K_c + K_f + K_l + K_n,$$

and the money value of social product, P , by this sum augmented by the money value S_v of social surplus:

$$P = K_d + K_c + K_f + K_l + K_n + S_v.$$

This is a money sum of stock and flow components. A part of it represents the value of the re-integrations of material means of production and workers means of subsistence; other parts are financial capital, cultural capital and intangible capital. The residual is surplus-value.

²⁴ A part of financial capital provides an answer to Keynes's 'finance motive for holding money'. It is an active component of the temporary demand for short-term investible funds destined to meet firms payment obligations in the period between the planning and the execution of an investment. Once the investment is completed, this finance should be replaced by long-term finance provided by institutional underwriters.

P can also be defined as a sum of operating and user costs. That is by the sum of the operating costs implied by the production of commodities and of the user cost of capital:

$$P = g + h = \sum c_{ot} + (r + \delta - e) p,$$

where g is total operating cost in production, h is the implicit rental cost of capital, c_{ot} is the operating cost at time t , r is the required rate of return, δ is the depreciation rate, e is the expected rate of asset price change and p the price index of capital services.

The user cost of capital is the sum of two flow-variables, the depreciation allowance of durable capital, $p_k \delta K_d$, and the implicit rental-cost of financial capital, a weighted average of interest and dividend costs.

Since the money value of social product is a non-homogeneous sum of stock and flow variables, a dynamic stock-and-flow integrated accounting framework is required to analyze the evolution of a capital stock over time. This implies the use of a flow-of-funds matrix, showing the flow of funds from one sector to another.²⁵ A correct analytical framework

²⁵ A formal model, in which capital goods are regarded as sources of capital services, is provided in the OECD 2009 manual on *Measuring Capital*, in terms of flows of capital services, reckoned at their market current prices. Another basic reference book is UNITED NATIONS and CENTRAL EUROPEAN BANK, *Financial Production, Flows and Stocks in the System of National Accounts*, New York, 2014. The aggregation of user costs over different capital vintages should take place in terms of standardized performance indicators. That is in standard efficiency units.

implies a flow-of-funds approach, where the interdependencies between income flows and quantitative changes in financial assets can be adequately considered.²⁶

The integrated accounting framework of the economy should include four distinct information tables. Namely: (i) a balance-sheet, that is a statement of the values of all assets and liabilities at a given point in time; (ii) a current account (the income generation and distribution account); (iii) a capital account, showing how saving and capital transfers finance capital accumulation (the net capital formation); and (iv) a flow-of-funds matrix, a ‘from-whom-to-whom’ intersectoral framework relating stocks and flows, where each row represents an asset and each column a sector.

The flow-of-funds accounting matrix can be transformed into a flow of funds general equilibrium model, by assuming that each cell in it contains a variable which has to be explained by an asset demand function.

2.2 Capital in equilibrium.

We live in a changing world in which the supply and demand for capital assets are seldom in equilibrium, because individual plans do not dovetail. A long-run basic tendency towards equilibrium can however be realistically assumed to exist. In long-run equilibrium, the structure of capital and the

²⁶ See, for example, Bain (1973).

rate of interest would be simultaneously determined by a threefold-margin of choice, between present and future consumption, real and financial investment, money and bonds.

The demand for a stock of capital and that for an investment flow are strictly related. The demand for investment is a function of the expected level of income, of aggregate demand, of the marginal efficiency of investment and of the interest rate, which reflects the state of the money market. It should include the inherited stock of capital goods, plus the net current output of them.²⁷ The supply of real capital is a stock-augmented variable.

Under conditions of steady state dynamic equilibrium, the theory of capital would be much simplified, because any act of saving would imply an equal amount of investment. Therefore there would be no logical need for money. This is what happens in neoclassical models. In such models, which are based on an aggregate production function characterized by diminishing returns to capital and on a capital accumulation function, a pair of dual relations must be satisfied in steady state equilibrium: between the rate of profit and the real wage (along the ‘factor

²⁷ In equilibrium, Lerner’s marginal efficiency of investment (MEI), a flow-variable expressing the demand for additional units of capital goods, should equal the demand for the existing stock of capital goods, i.e. Keynes’s marginal efficiency of capital (MEK), a stock-variable. Both of them are decreasing functions of the rate of interest and should equal this rate in equilibrium.

price frontier') and between the rate of growth of the economy and per capita consumption (along the 'consumption frontier'). No discrepancy between savings and investment can arise. The accumulation of capital is determined by the saving behaviour of firms and households. Complete substitutability between capital and labour and perfect price flexibility are usually assumed. Hence all markets clear and there is full employment. Capital will be free to move and adjust instantaneously and completely in such a way to equalize everywhere the marginal product of capital.

In Keynesian models, where savings depend on the level of income, in correspondence of any exogenously given rate of interest there will be as many supply functions of capital as possible levels of income. Equilibrium in the capital goods market is brought about by changes in prices. Together the demand and the supply functions of capital goods determine the equilibrium stock of capital. In equilibrium two conditions must be satisfied: the expected rate of return on capital must be high enough to induce firms to hold their endowment of capital goods, and the current supply of capital goods must be such to make the marginal cost of production equal to the market price of a unit of real capital. For each endowment of capital goods, a different market price and a different rate of return will be associated in equilibrium with each rate of output of capital goods and with each rate of investment.

2.3 Capital in disequilibrium. The dynamics of capital accumulation.

We shall now consider the dynamic behaviour of a changing economy in which capital is in disequilibrium. Unfortunately, up to now disequilibrium in the market of capital goods, unlike disequilibrium in other markets, has not been adequately analyzed.

Disequilibrium implies a stock adjustment process involving changes in prices and/or quantities. A price adjustment scheme has therefore to be defined. The required equilibrating process should involve two types of choices by the firms: an investment or disinvestment decision and a financial decision.

Under stochastic risk conditions, the price of a capital asset is the expected discounted payoff

$$p_t = E(m_{t+1}, x_{t+1}),$$

where p_t is the asset price at time t , m_{t+1} is a linear stochastic discount factor and x_{t+1} is the asset payoff in the next period. This is our basic pricing equation, in implicit form.

Asset prices should equal the sum of the discounted rental payments of asset services. Investment will be made up to the point in which the present value of expected future revenue will equal, at the margin, the opportunity cost of capital, and the market value of assets will equal the replacement cost of capital

goods. Hence in equilibrium the net present value of the expected stream of future cash flows will be zero.²⁸

The equilibrium conditions are far more complex out of neoclassical growth models. In Keynesian models non-substitutability of productive factors, i.e. fixed coefficients of production, is assumed. Factors are strictly complementary. The production function is of activity analysis type. Markets do not clear. There is wage and price downward inflexibility and unemployment is present. If an IS-LM analysis is applied and a Phillips curve is used to depict the inflation-unemployment trade-off, the result is an integrated IS-LM-PC approach, in which savings adjust to autonomous discretionary investment.

2.4 Monetary expressions of value.

Let us now analyze whether the quantity of labour-time represented by a unit of money, and its inverse, are theoretically determinable and empirically appraisable in the presence of inconvertible fiat money.

Marx used to call “monetary expression of value” (MEV) the money equivalent of abstract labour-time. That is a

²⁸ The net present value method is theoretically correct, but may be difficult to apply, as it requires substantial knowledge of uncertain future data. Stability of equilibrium can be ensured by varying relative factor prices and factor proportions in such a way to make the rate of capital accumulation equal to the rate of growth of output.

proportionality factor relating the social substance and the money-form of value, for the economy as a whole.²⁹

The unit cost of real capital can be measured in terms of labour-time, in the classical tradition, or in wage units, as suggested by Keynes, and can then be converted into money units. If we denote by C_R the money cost of a unit of real capital, by C_L that of a unit of living labour, by C_K that of a unit of other input services, by C_F that of a unit of financial capital and by r the average expected rate of return on a unit of invested capital, MEV can be written as the sum of the real unit cost of production and the corresponding unit financial cost of capital, $r(C_R + C_L + C_K)$:

$$\text{MEV} = (C_R + C_L + C_K) (1 + r),$$

or, in vector notation,

$$(px - \varepsilon)/L = (px - \varepsilon)/\ell x.$$

Here p is a price index, that of the vector of commodities unit prices, $wL [I - (1 + r) A]^{-1}$; x is a quantity or volume index of the social product; px is the value of social product; ε is the notional capital charge; L is abstract labour-time expressed in money terms and ℓ the vector of labour coefficients.

MEV is not an invariable standard of value, independent of prices and the distribution of income. No such standard of value exists. MEV is simply a useful proxy.

²⁹ ‘Monetary expression of value’ is the locution used by Marx in *Value, Price and Profit* (1865), where he pointed out that “price, taken by itself, is nothing but the *monetary expression of value*”.

In principle, an alternative to MEV is provided by the “monetary expression of labour time” (MELT), the money value of abstract living labour time commanded by commodities, measured by the ratio of net value-added to the living labour employed. This is a distinct money metric, preferred by several neo-Marxist authors. It is the reciprocal of the exchange-value of money and implies that the sum of prices should equal the sum of values multiplied by MELT.

In our opinion, MEV should be preferred. It is a more general expression of the money value of social labour time. It accounts for the notional cost of invested capital and does not privilege living labour.

If we divide MEV by the average unit cost of production of commodities, we obtain the capital accumulation coefficient $(1 + r)^t$, where r is the internal rate of return, the discount rate which reduces to zero the net present value of the expected cash flows of an investment.³⁰

2.5 On the direction of causality.

Value is created in production and realized in money-form by an exchange. The realization takes place at current market prices, that result from the interaction of supply and

³⁰ This rate cannot be used to compare mutually exclusive investment projects. Its use is not free of problems, because its value cannot be directly obtained by solving an exponential equation. The use of this metric implies an instantaneous reinvestment at the same rate of all future cash flows.

demand. As supply and demand depend on the price level, there is a bidirectional causal dependence.

The causal direction of the relationship between the financial and the real sector of the economy is a controversial subject. Does causality run from the financial sector to the real one, for the role played by banks in stimulating the growth of the real sector? Or is the behaviour of the financial sector ultimately determined by the needs of the real sector? Which is the driving force at work?

We believe in a bidirectional causal nexus. The supply of money has a mixed exogenous and endogenous nature. There is an exogenous component, fiat money, and an endogenous one, credit money, provided by banks on demand, in form of bank loans or overdraft facilities.³¹

Some fundamentalist post-Keynesians working in the banking school tradition, the ‘horizontalists’, consider the supply of money infinitely interest-elastic at the interest rate established by the monetary authority. They represent it by a horizontal line in the quantity-interest space. They disregard the use of money as a liquid store of wealth, consider the interest rate unaffected by lending and downgrade the central bank to

³¹ The determination of the prevalence of the endogenous or the exogenous component in the nominal supply of money is still an open problem. The real supply of money has an endogenous nature. It depends on the velocity of circulation and thus, indirectly, on the demand for money.

the role of a compliant lender of last resort. The short-term interest rate is considered the key monetary policy instrument.

The ‘verticalists’, on the contrary, assume that the money supply, represented by a vertical schedule, matched by a downward-sloping curve of the demand for money, is subject to a discretionary control by the central bank. The two schedules intersect at the market interest rate. They do not regard money as neutral in the long-run and favour an inflation targeting policy.

An intermediate theoretical position is held by the ‘structuralists’, the exponents of a PK current who conceive the supply of money as represented by a positively sloped line obeying Kalecki’s principle of increasing risk. They pay due attention to the monetary base and to the sensitivity of the money multiplier to the portfolio choices made in the private sector.³²

2.6 Theoretical relevance and policy implications.

We can now try to summarize the main results of this paper. Our declared intention has been to recall and develop some heterodox and somewhat neglected late-Marxian views concerning the ultimate source and the real measure of value. They involve a refusal of the pure labour theory of value and the adoption of a full-cost-of-production theoretical conception,

³² On this point, see Cavalieri (2004).

inclusive of the opportunity-cost of financial capital and implying mark-up pricing.

Once capital goods are correctly recognized as a direct source of surplus-value, the increasing use in production of capital-intensive techniques does not provide an argument in support of Marx's belief in the historical tendency of the general rate of profit to fall.

As concerns the necessary characterization of the stock or flow dimension of capital, we have maintained that in the real world capital goods are not a static entity. They are a revolving stock. The flow approach to money, implied by the neoclassical loanable funds theory and shared by the 'monetary circuitists', is therefore improper and should be rejected.³³

Some implications can be drawn from this essay also as concerns the kind of monetary policy should that should be pursued. Should tactical choices be determined by fixed rules, as maintained by monetarists, or by discretionary decisions of the monetary authorities, in the Keynesian way?

The answer depends on the type of transmission mechanism of monetary policy which is considered. The variable, or the set of variables, to which a crucial role is

³³ The flow approach is also inconsistent with Keynes's liquidity preference theory, where money is a liquid store of value which allows for financial hoarding and dishoarding.

attributed in the transmission of the effects of money shocks to the real variables should be controlled.

The monetary authorities are in a monopolist position in the money market, as the only issuer of fiat money and the regulator of the supply of credit money. They can therefore choose to control either the quantity or the price of money. When they opt for the quantity, the interest rates should be free to fluctuate to adjust the demand for money to the money supply. If, on the contrary, a stabilization of interest rates is pursued, the monetary authorities should supply all the monetary base that the market requires at the interest rates that have to be preserved.

People will probably react to changes in money supply by adjusting the level of their expenditure, or by selling goods and services to restore the desired proportion between liquid funds and total assets. This can generate real balance effects, that would make the monetary policy effective even in the presence of a liquidity trap.

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Abstract: *Towards an integrated theory of value, capital and money.*

This is an analysis of the present state of the theory of capital. The paper contains a proposal to reformulate this theory in an 'late-Marxian' up-to-dated perspective. The central problem discussed is the integration of the theories of value and capital with those of money and finance. An augmented cost-of-production theory of value is advocated. Special attention is focused on the role of Marx's 'monetary

expression of labour value' (MEV), rediscovered and unduly modified by neo-Marxists with the purpose to make it compatible with Marx's labour theory of value.

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Keywords: value; labour; capital; money; critical Marxism; MEV; MELT.